



# Isolated primary squamous cell carcinoma of the tympanic membrane

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## ABSTRACT

**INTRODUCTION:** Primary squamous cell carcinoma (SCC) of the tympanic membrane is exceptionally rare. We describe the history, investigation and management of this disease.

**PRESENTATION OF CASE:** A 68-year-old woman presented with a three month history of intermittent otorrhoea and external ear canal (EAC) pruritus. Otoscopy revealed a polypoidal granular nodule, confined to the posterior aspect of the tympanic membrane. Examination under anaesthesia (EUA) confirmed that the lesion was confined to the tympanic membrane, with a surrounding rim of normal drum. Biopsies were consistent with well differentiated SCC.

**DISCUSSION:** Following discussion at multi-disciplinary team meeting for treatment planning, the patient underwent lateral temporal bone resection with ipsilateral superficial parotidectomy and selective neck dissection. Post-operative histology confirmed an SCC confined to the tympanic membrane.

**CONCLUSION:** SCC of the tympanic membrane is an extremely rare condition. As with early temporal bone SCC, surgical resection with adjacent structure clearance remains the primary treatment modality.

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## 1. Introduction

Primary squamous cell carcinoma (SCC) of the tympanic membrane is exceptionally rare. To the best of our knowledge, there are only three previously reported cases in the English literature.<sup>1–3</sup>

We describe a patient diagnosed with primary SCC of the tympanic membrane and review previously reported cases. We also discuss the presentation, history, investigation, diagnosis, and management of this condition.

## 2. Presentation of case

A 68-year-old woman presented with a three month history of intermittent otorrhoea and external auditory canal (EAC) pruritus. She had no prior history of ear disease. Otoscopy revealed a polypoidal granular nodule, confined to the posterior aspect of the tympanic membrane. This was initially assumed to be secondary to otitis externa and was treated with oto-topical preparations, but with minimal response. An examination under general anaesthesia was then performed. At this initial clinical assessment, the lesion was wholly confined to the tympanic membrane, with a surround of normal drum separating it from the EAC. Biopsies of the granular tissue were taken. Histology revealed a well differentiated SCC [see Fig. 1].

The patient was referred to the Head and Neck Oncology service for further investigation and management. At repeated examination, granular tissue was noted once again on the tympanic membrane, but by this time appeared to be extending onto the posterior EAC, suggesting a diagnosis of SCC of the ear canal. CT and MRI of the temporal bone and neck did not suggest any local invasion or regional lymphatic disease.

Both pathological analysis of the initial biopsy and radiological imaging were discussed at our regional multi disciplinary team meeting for staging and formulation of a management plan. The patient underwent lateral temporal bone resection with ipsilateral superficial parotidectomy and selective neck dissection. Post-operative histology confirmed isolated SCC of the tympanic membrane. Examination of the granular area; adjacent to the posterior EAC wall; revealed moderate dysplasia but no evidence of malignancy. Parotid and neck specimens were clear of disease.

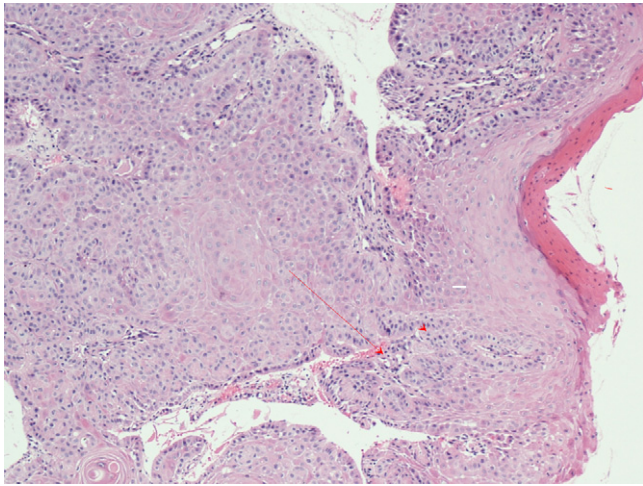
## 3. Discussion

Isolated SCC of the TM is exceptionally rare. This is the fourth reported case since the initial description by Gisselsson et al. in 1951.<sup>1</sup> In each case, initial symptoms were consistent with chronic otitis externa and otoscopic examination revealed granular lesions on the tympanic membrane.<sup>1–3</sup>

In the three previous cases, initial biopsy was suspicious for but not diagnostic of malignancy. Definitive diagnosis was only made post-resection.<sup>1–3</sup> In contrast, the initial biopsy of our patient's tympanic membrane lesion yielded a histological diagnosis of SCC. Although its apparent extension onto the posterior wall of the EAC suggested a diagnosis of EAC SCC, definitive pathology

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**Fig. 1.** Parakeratotic and acanthotic squamous proliferation showing keratinisation, lack of maturation and cytologic atypia. Irregular basal budding of atypical squamous epithelium is present, consistent with invasive squamous cell carcinoma (see red arrows).

post-resection confirmed that the invasive component was entirely confined to the tympanic membrane.

CT temporal bone is currently the imaging modality of choice for assessment of malignant lesions of the ear and temporal bones. For pre-operative work up, it is the best modality to assess for bony invasion into the temporal bone and ossicular chain. In our patient, we included an MRI scan to assess for any soft tissue invasion of the EAC or regional lymphatic disease.

As SCC of the tympanic membrane is so rare, there is no consensus regarding aetiology, staging, investigation, or management. The four reported cases including our patient do not suggest any consistent demographic or aetiological features; they have occurred equally in males and females, and over a broad age range (42–70 years).<sup>1–3</sup> Due to its rarity, identifying specific aetiological factors for tympanic membrane SCC has been difficult. It is reasonable to postulate that SCC of the tympanic membrane would share similar risk factors with SCC of EAC. These include diabetes, chronic otitis media, cholesteatoma, chronic otitis externa, tobacco consumption, HPV, and exposure to radiation. However, only one of the four reported patients was diabetic, and none of the patients presented with any of the other risk factors.

In the absence of a specific staging system for SCC of tympanic membrane, we adopted the Modified Pittsburg staging system, which is based on the TNM classification of temporal bone carcinoma [Table 1].<sup>4</sup> This system includes neoplasms arising from

EAC and middle ear, and classifies them according to degree of invasion.

All reported cases including our own have been managed surgically. The earlier cases were managed with local resection of the tympanic membrane lesion alone; in the latter two cases, including our own, more aggressive surgery was undertaken.<sup>1,2</sup> The cartilaginous portion of EAC serves as a poor barrier to spread of malignancy. Tumour can invade the parotid gland anteriorly, the concha and post-auricular sulcus posteriorly, and spread into the temporal bone via the Fissures of Santorini. First echelon lymphatic drainage of EAC is to the parotid and peri-parotid lymph nodes and often extends to upper jugular, deep cervical, and mastoid lymph nodes. We think it is likely that SCC of the tympanic membrane could potentially spread in a similar manner. Thus, even in the absence of local invasion or regional lymphatic disease on imaging, we believe that lateral temporal bone resection with parotidectomy and selective neck dissection for both staging and loco-regional control is the appropriate surgical management.

Radiotherapy as a primary treatment modality is of limited value for management of temporal bone carcinoma. Adjuvant radiation therapy is indicated in cervical node positive patients. In general, radiotherapy may provide limited benefit and so it is generally believed that combined management modalities consisting of primary surgical resection followed by radiotherapy improves survival. Due to the very localized nature of her disease, we did not feel that the risk of additional morbidity secondary to radiotherapy was justified in our patient. In patients deemed unfit for surgery, or with unresectable disease (T3 and T4), palliative chemoradiation therapy may be offered.<sup>5</sup>

Early temporal bone tumours (T1 and T2) carry a good prognosis. Moody et al. and Moffat et al. reported 80–100% five year survival rates in patients who had primary surgical resection, with or without adjuvant radiotherapy. T3 and T4 lesions carry poor prognosis regardless of treatment, with advanced tumours carrying two year survival rates of less than 40%.<sup>4,6</sup> As with other head and neck cancers, the presence of neck metastasis is associated with a poorer prognosis. Although prophylactic neck dissection is a common practice, there is no objective evidence that it improves survival.

#### 4. Conclusion

SCC of the tympanic membrane is an extremely rare condition. As with early temporal bone SCC, surgical resection with adjacent structure clearance remains the primary treatment modality.

#### Conflict of interest

None declared.

#### Funding

None declared.

#### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Authors' contributions

CW involved in drafting and writing article, data collection, performing surgery, DS involved in writing and revising article,

**Table 1**  
Modified Pittsburg staging system of temporal bone carcinoma.<sup>4</sup>

Status	Description
T status	
T1	Tumour limited to the EAC, without bone erosion or soft tissue extension.
T2	Tumour with limited EAC bone erosion or <0.5 cm soft tissue extension.
T3	Tumour with full thickness EAC bone erosion, <0.5 cm soft tissue involvement or tumour involving the middle ear, mastoid, or both.
T4	Tumour eroding the cochlea, petrous apex, medial wall of the middle ear, carotid canal, jugular foramen or dura, or >0.5 cm soft tissue involvement or facial nerve paresis.
N status	Identical to nodal status of the other head and neck cancer TNM staging system
M status	M1 denotes distant metastasis and considered as stage IV disease

performing surgery, JK and DM involved in clinical consultant, performing surgery, and are senior authors.

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